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(54) Integrated circuit having unique lead configuration

(57) The present invention is generally directed to an integrated circuit package (100) having a unique lead configuration, wherein the integrated circuit package is constructed from a die (502) containing an integrated circuit. The die (502) has a plurality of leads (504) for carrying electrical signals to and from the integrated circuit, wherein the plurality of leads are disposed over a bottom side of the die (502). The package further includes a multi-layer substrate (506) having at least two signal layers. The substrate (506) is juxtaposed against the die (502) and has a plurality of contacts (507) disposed along a top side to align with the leads (504) of the die to carry the electrical signals to conductive paths within the at least two signal layers. The multi-layer substrate has a larger adjoining surface area than the die and further has a plurality of leads (520) disposed across a bottom side for connection with a printed circuit board (508), the on the bottom side being in communication with the leads of the top side by way of the conductive paths disposed within the substrate. The leads (504) of the die (502) are disposed such that at least two high speed rows (620, 622) of leads are disposed in parallel fashion near the center of the die (502), wherein the high speed rows (620, 622) are for carrying high frequency electrical signals. At least two sets (617, 619) of low speed rows of leads are disposed in parallel fashion near the sides of the die, and spaced apart from the

high speed rows.

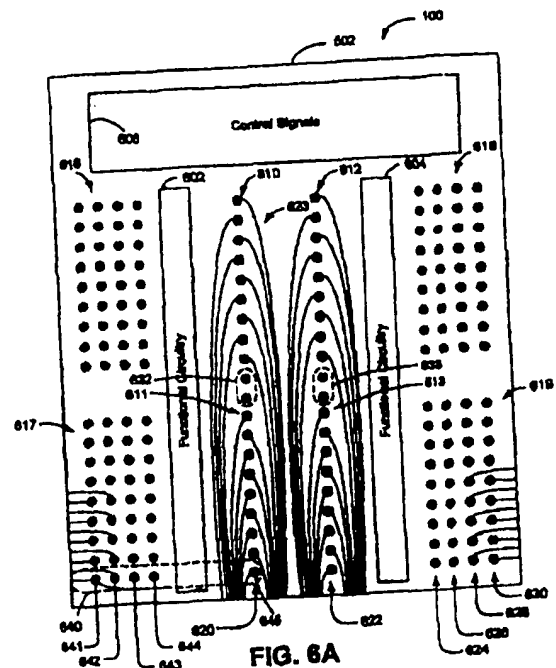


FIG. 6A

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EUROPEAN SEARCH REPORT

Application Number
EP 99 10 1126

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP 0 602 338 A (HITACHI LTD ;HITACHI MICROCOMPUTER ENG (JP)) 22 June 1994 (1994-06-22) * abstract; claim 1 * * column 1, line 24 - column 2, line 24 * * column 3, line 19 - line 33 *	1-9	H01L23/498 H01L23/64 H01L27/02
A	US 5 729 435 A (MINAMIZAWA MASAHARU ET AL) 17 March 1998 (1998-03-17) * column 5, line 54 - line 60 *	1-9	
A	EP 0 533 589 A (FUJITSU LTD) 24 March 1993 (1993-03-24) * column 3, line 15 - column 4, line 30; figure 6 *	1	
A	US 4 393 464 A (KNAPP GEORGE W ET AL) 12 July 1983 (1983-07-12) * column 1, line 1 - column 2, line 29 *	1	
A	EP 0 276 940 A (HITACHI LTD) 3 August 1988 (1988-08-03) * figure 6 *	6,7	TECHNICAL FIELDS SEARCHED (Int.Cl.8)
A	EP 0 417 345 A (IBM) 20 March 1991 (1991-03-20) * abstract * * claim 1; figures 1, 4 *	1-9	H01L G06F
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 10 March 2000	Examiner Le Meur, M-A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EP 99 10 1126

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

10-03-2000

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0602338	A	22-06-1994	JP 2148860 A	07-06-1990
			JP 2153459 A	13-06-1990
			JP 2856324 B	10-02-1999
			DE 68922073 D	11-05-1995
			DE 68922073 T	10-08-1995
			EP 0371696 A	06-06-1990
			US 4994902 A	19-02-1991

US 5729435	A	17-03-1998	JP 8017964 A	19-01-1996
			US 5978222 A	02-11-1999
			EP 0685878 A	06-12-1995
			EP 0915504 A	12-05-1996

EP 0533589	A	24-03-1993	JP 2932785 B	09-08-1999
			JP 5082703 A	02-04-1993
			DE 69226742 D	01-10-1998
			DE 69226742 T	14-01-1999
			KR 9603767 B	22-03-1996
			US 5648680 A	15-07-1997

US 4393464	A	12-07-1983	CA 1157952 A	29-11-1983
			EP 0066605 A	15-12-1982
			JP 57501984 T	04-11-1982
			WO 8202102 A	24-06-1982

EP 0276940	A	03-08-1988	JP 63187639 A	03-08-1988

EP 0417345	A	20-03-1991	SG 46176 A	20-02-1998
			AU 630225 B	22-10-1992
			AU 6131590 A	21-03-1991
			CA 2024848 A	20-03-1991
			CN 1050289 A	27-03-1991
			DE 68926886 D	29-08-1996
			DE 68926886 T	06-02-1997
			HK 203396 A	15-11-1996
			JP 2748319 B	06-05-1998
			JP 3106053 A	02-05-1991
			KR 9401394 B	21-02-1998

CEM 90459